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J. CALASIBETTA ET AL
 MULTIPLE COMPARTMENT BAG HAVING READILY
 SEPARABLE INDIVIDUAL COMPARTMENTS
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2,805,814

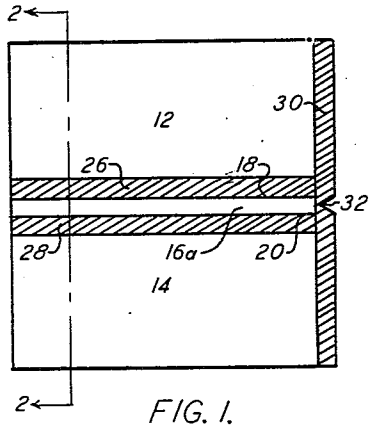


FIG. 1.

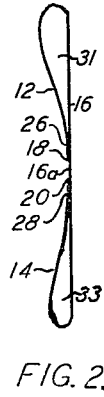


FIG. 2.

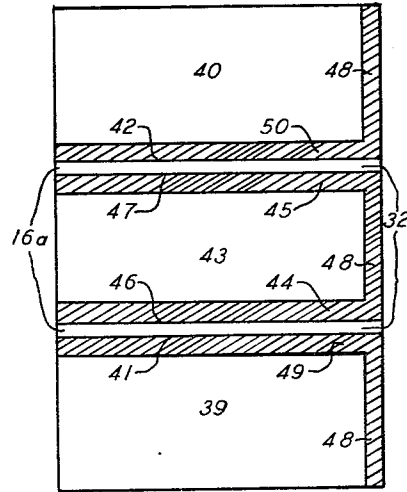


FIG. 3.

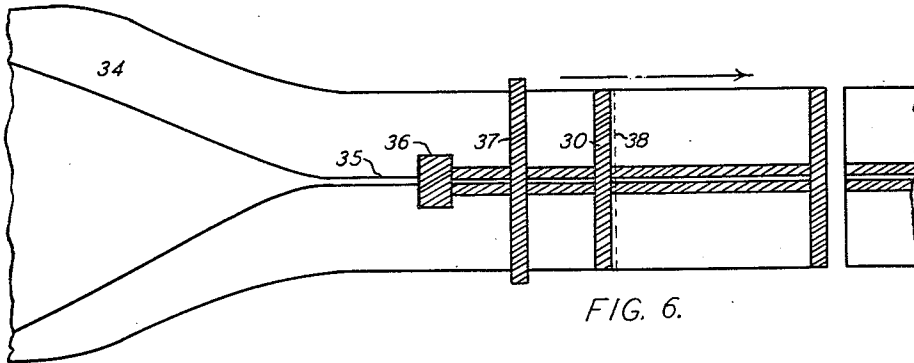


FIG. 6.

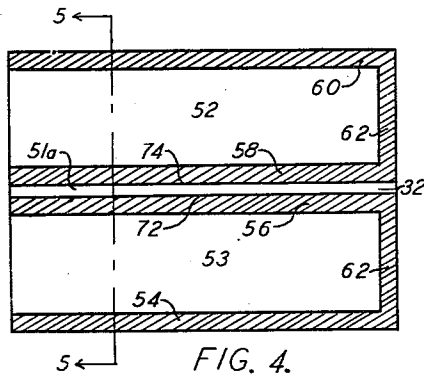


FIG. 4.



FIG. 5.

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MULTIPLE COMPARTMENT BAG HAVING READILY SEPARABLE INDIVIDUAL COM- PARTMENTS

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7 Claims. (Cl. 229—56)

This invention relates to improvements in heat-sealed bags, and particularly to an improved heat-sealed bag of the multiple-compartment type.

In so-called multiple-compartment bags of the type with which the present invention is concerned, two or more individual bag compartments are fabricated in a composite structure, the arrangement being such that the individual compartments can be separated readily from the group without disturbing the remaining compartments. With such an arrangement, the packaged units can be utilized individually as required, keeping the remainder in their original protective covering for later use.

In one common type of multiple-compartment bag, the adjoining compartments are connected by a web or material that is perforated to provide a tear line which is intended to facilitate tearing the individual sections apart. However, in addition to the added manufacturing operation of punching out the perforations, this is not an entirely reliable expedient, as the material will not always separate readily along the intended line. Particularly is this true in the case of bags made of heat-sealable thermoplastic or thermoplastic coated material, such as cellophane, or the like. Such materials have the property of being quite difficult to tear initially, and then of tearing in a more or less random fashion once a tear is started. This tendency toward irregular tearing heretofore has prevented the production of an entirely satisfactory multiple-compartment plastic bag. Even when the connecting area between the compartments is perforated to provide a tear line, the tear frequently is difficult to make since it must, in effect, be started anew at each perforation. Furthermore, there is a very good chance that the tear will not run true from one perforation to the next, but instead will start off at an angle that will take the tear directly into one of the package compartments. Once this happens, not only is the protective covering of the torn compartment destroyed, but it becomes quite difficult to separate the two compartments at all.

It is, accordingly, a general object of the present invention to provide an improved multiple-compartment bag from which an individual unit can be removed readily without in anywise interfering with the remaining units, and a structure in which the units are securely attached to each other prior to desired separation.

In accordance with a preferred embodiment of the invention, the foregoing and other related objects and advantages are attained in a multiple-compartment heat-sealable bag wherein the compartments are joined by a line of single-thickness strip of imperforate material, bounded on each side by double-thickness layers of material where the front and back panels of the compartments are bonded together. There is thus provided between the compartments a narrow connecting strip that can be torn readily without danger of tearing into the body portion of the compartments themselves, the heat-sealed double-thickness layers along the edges of each connecting strip forming guides that are much more resistant to tearing than the single-layer section that forms the connecting link.

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A more complete understanding of the invention can be had by reference to the following description of illustrative embodiments thereof, when considered in connection with the accompanying drawing, wherein:

5 Figure 1 is a plan view of a two-compartment bag embodying the invention;

Figure 2 is a cross-sectional view of the same bag taken on the line 2—2 of Figure 1;

10 Figure 3 is a plan view of a three-compartment bag embodying the invention;

Figure 4 is a plan view of a modified form of a two-compartment bag embodying the invention;

Figure 5 is a cross-sectional view taken on the line 5—5 of Figure 4; and

15 Figure 6 illustrates a method of forming a two-compartment bag, such as shown in Figures 1 and 2.

As shown in Figure 1 of the drawings, a two-compartment bag is formed from a substantially rectangular sheet or blank of heat-sealable material. In this embodiment of the invention, substantially rectangular opposite side portions 12, 14 of the original blank are folded over and inwardly to overlay the center portion 16, thereby forming front panels 12, 14 and a back panel 16. The edges 18, 20 of the front panels 12, 14 are brought nearly together at the center of the back panel 16, and there are cemented, heat-sealed or bonded in any suitable fashion to the back panel along strips 26, 28.

In the embodiment of the invention presently being described, a lateral strip 30 along one end of the bag is folded over and sealed, either to the front of the package, as shown, or to the back, to form a bottom closure. Alternatively, the fold may be omitted and the front and back sheets cemented or heat-sealed together.

With the front panels 12, 14 thus peripherally joined to the back panel 16, there are formed two separate bag compartments 31, 33 connected by a narrow line 16a of a single layer of the back panel. It will be noted that the bonding of the adjacent front panel edges 18, 20 to the back panel 16 forms two parallel double-thickness strips 26, 28 on each side of the single thickness connecting strip 16a, to serve as tear guides. In the end closure strip 30, there is provided at the center a small notch or slit 32 to serve as a means of starting a tear when the two bag sections are to be separated.

Ordinarily, the commodity to be packaged next will be placed in the bag, and the open end sealed. When the two parts are to be separated for individual use, it will be found that the end closure can be grasped on opposite sides of the starting notch 32 and the two sections 31, 33 torn apart readily. Due to the fact that the double layer seal lines 26, 28 will not tear as readily as the adjacent single layer strip 16a, there is no tendency whatsoever for the tear line to veer off into either of the compartments. In fact, it is quite difficult to force the tear line to extend into the seal area on either side, even when a special effort is made to do so.

It will, of course, be understood that the end closures can be made in other ways than as described and shown in Figure 1. For example, usually it is sufficient simply to seal laterally across the bags.

In constructing the bag, it is important that the very edges 18 and 20 of the front panels be sealed securely to the back panel as this forms an abrupt change in the effective thickness of the material and forms a positive guide for the separation of the material along the selected tear line. If these edges 18 and 20 are not sealed securely, the tear may extend under the loose edge where the irregular path of the seal may cause the tear to extend outside the desired path.

Preferably the adjacent edges 18 and 20 of the front panels 12 and 14 are substantially in abutting, but not overlapping, relationship. As a matter of safety to pre-

vent any overlapping caused by irregularities in the plastic material or in the operation of the machine, the adjacent edges may be separated by $\frac{1}{64}$ to $\frac{1}{32}$ of an inch, although wider separation may be employed if desired. With wider separation, some waste of material is inevitable and the tear limits are not defined with as much certainty, that is, as the distance between the adjacent edges is increased, the chance that the tear will approach one of the edges at a substantial right angle is somewhat increased.

The construction described above has a number of advantages relating not only to the utility of the finished bag but to the speed and economy of its manufacture. The bags are manufactured advantageously from a continuous strip of heat-sealable packaging material, such as cellophane or heat-sealable glassine. Figure 6 illustrates one method of manufacture in which the outer edges of a continuously moving flat strip 34 of plastic material are folded over and inwardly so that they are almost in abutting relationship along the center of the strip as indicated at 35. The strip moves under a heat-seal unit, diagrammatically shown at 36 which seals the edge portions of the strip to the adjacent layer. It will be observed that only a single heat-sealing roller or slide is required so long as it is wide enough to extend over both of the edges of the plastic. Devices for making such longitudinal heat seals are already known.

After the longitudinal heat seal has secured the edges, the packaging material is passed through a transverse heat-seal device 37 which makes the seal 30 to form the bottoms of the bag. Apparatus for making such transverse seals are already known, for example, apparatus of the type described by Ladislav Moravec and Alfred Gans in U. S. patent application Serial Number 319,372, filed November 7, 1952 (now U. S. Patent 2,670,783) is suitable.

The strip is then cut transversely adjacent to seal 30, as along the broken line 38, to form the individual compartmented bags. If desired, the transverse seal may be made prior to the longitudinal seal.

Heat-sealing is to be preferred over gluing or cementing the edges of the strip. If the cement is not carried fully to the edge of the packaging material, there will be more tendency for the tear to leave the longitudinal line bounded by the two edges; if the cement extends beyond the edges into the tear line, the resistance to tear is increased with the result that the tear may extend into the double thickness layer of plastic.

If more than two compartments are required in each bag, the structure shown in Figures 1 and 2 can be modified to provide as many compartments as desired. Figure 3 shows a plan view of a three-compartment bag.

The front panels 39 and 40 of the two outermost bag compartments are formed in the same manner as in Figures 1 and 2, by folding side sections of a blank or sheet of material to overlay parts of the center portion of the blank. However, in the Figure 3 arrangement, the edges 41 and 42 of these overlaying portions of the original blank are spaced apart a distance approximately equal to one-third of the width of the finished package, and a second sheet 43 of plastic material of appropriate width is bonded along both edges as at 44 and 45 to the back panel to serve as the front panel for the central compartment of the bag. The edges 41 and 42 of the outermost front panels 39 and 40 similarly are bonded to the back panel, with the edges 41 and 42 being spaced only slightly from and parallel with the adjacent edges 46 and 47 of the center front panel 43. A lateral seal 48 along one end of the bag serves as a bottom closure.

As before, the double thickness strips 49 and 44, and 50 and 45, formed by bonding the front and back panels serve as guides on both sides of the tear lines provided by the single-thickness strips 16a connecting each adjacent pair of bag compartments. A slit 32 at the end of each tear line area 16a provides an easy start for the tear.

It will, of course, be obvious that any number of front panels can be added in the same fashion as the center

panel 42 in Figure 3 to provide as many individual compartments as desired.

It should be noted also that all of the front panels for a multiple-compartment bag embodying the invention can comprise separate sheets or strips of material, similar to the center panel 43 in Figure 3, rather than having the two outermost panels formed by folded-over portions of the back panel sheet. This is illustrated in Figures 4 and 5, wherein there is also shown a bag having pleated front panels permitting greater expansion of the bag when filled.

The bag shown in Figures 4 and 5 comprises a single sheet back panel 51 having individual front panel blanks 52 and 53 bonded thereto along both edges 54, 56 and 58, 60, and along the bottom 62. Adjacent the edge seal lines 54, 56, 58, 60, the front panels 52, 53 are formed with pleated folds as at 64, 66, 68, 70 that allow the bags to lie flat prior to filling and to expand readily when filled. As before, the adjacent edges 72, 74, of the front panels 52, 53 are spaced slightly apart to lie parallel along a well-defined, imperforate section 51a of the back panel 51, which section 51a forms the connecting link between the individual bag sections. The bag sections in the Figures 4 and 5 construction can be separated readily, as with the bags already described, by grasping the end closure seal 62 on each side of the starting slit 32 and tearing along the strip 51a.

As in the multiple-compartment bags already described, it is important that the edges 72 and 74 lie in abutting relationship facing one another in order to provide sharp well-defined limits for the tear zone 51a. Such sharp limits are not defined if the face panels are folded over so that the center edges 72 and 74 are along the outside edges of the seals 56 and 58 instead of along the inside edges of these seals as shown in Figures 4 and 5.

What is claimed is:

1. A multiple-compartment bag comprising an imperforate single-layer back panel and a plurality of front panels each peripherally joined along three edges to said back panel to form with said back panel a plurality of separate bag compartments in side-by-side relation, the adjacent edges of each adjacent pair of said front panels being parallel and spaced slightly apart and nearly in abutting relationship, the adjacent edges of the front panels being joined to the back panel along their very edges, the corresponding bag compartments being joined solely by a narrow strip portion of said back panel bounded along each side by a double-layer tear guide formed by the very edges of the front panels joined to the back panel, each said strip portion having a cut in one end to facilitate tearing said strip portion.

2. In a two-compartment bag, a substantially rectangular blank of heat-sealable material comprising opposite side portions and a central portion, said opposite side portions of said blank being folded to overlay the center portion thereof, the adjacent edges of said overlaying portions being substantially parallel, spaced apart slightly and having a narrow imperforate strip of said central portion therebetween and being heat-sealed to said central portion and forming a pair of bag compartments having back panels comprising said central portion and front panels comprising said overlaying portions, with said compartments being joined by said narrow imperforate strip of said central portion, said strip having a slit at one end to facilitate tearing said strip to separate said compartments.

3. A multiple-compartment bag comprising a continuous, imperforate, single-layer back panel, a plurality of substantially rectangular front panels each joined along three edges to said back panel in side-by-side relation and each forming with said back panel a separate bag compartment, the adjacent edges of each adjacent pair of said front panels being in substantial abutting but spaced relationship and having therebetween a narrow strip portion of said back panel, the corresponding bag compartments being joined by the narrow strip portions of said back

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panel, each said strip portion having tear-starting means therein at one end to facilitate tearing said strip portion.

4. In a two-compartment bag, a substantially rectangular blank of imperforate heat-sealable material, opposite side portions of said blank being folded to overlay the center portion thereof, the adjacent edges of said overlaying portions being spaced apart slightly and sealed by heat-seals to said central portion and forming a pair of bag compartments having back panels comprising said central portion and front panels comprising said overlaying portions and joined by a narrow strip of said central portion, said heat-seals extending to the very edges of said overlaying portions and said very edges of said overlaying portions sealed to said central portion forming abrupt changes in the effective thickness of the material and providing tear guides confining a tear to said narrow strip, said strip having means at one end to facilitate starting tearing said strip to separate said compartments.

5. A multiple-compartment bag comprising a plurality of peripherally joined substantially rectangular front and back panels forming a plurality of bag compartments arranged adjacent one another, and a single-layer strip of imperforate heat-sealable material connecting each adjacent pair of said compartments, said strip and said back panels comprising a single continuous layer of material, said strip having a cut at one end to facilitate tearing said strip to separate said adjacent compartments.

6. In a multiple-compartment plastic bag of the type comprising a plurality of integral bag compartments each having peripherally joined front and back panels joined along three edges, the improvement which comprises a single layer strip of imperforate plastic material connecting each adjacent pair of said compartments, said strip and said back panels comprising a single continuous layer of material, said front and back panels being bonded together on each side of each said strip and the bond extending along the very edges of said front panels to

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provide a pair of parallel double-layer tear guides bounding said strip, each said strip having a slit at one end to facilitate tearing said strip to separate said adjacent compartments, the adjacent edges of said double-layer tear guides being spaced less than $\frac{1}{32}$ inch apart.

7. A multiple compartment bag of heat-sealable material having at least two bag compartments joined together and adapted to be readily torn apart comprising an imperforate back panel, at least a pair of front panels each peripherally joined along three edges to said back panel and forming with the back panel a pair of separate bag compartments in adjacent relationship, the very edges of said pair of front panels being closely spaced and in parallel relationship with a narrow strip of said back panel between said very edges, said very edges being heat sealed to said back panel along their lengths forming closely spaced tear guides bounding said narrow strip and being thicker than said narrow strip, said very edges confining a tear to said narrow strip of the back panel and directing the tear along the length of said narrow strip, whereby said bag compartments are readily separated by tearing along said narrow strip.

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